**Detailed Office Action**

The amendments dated 3/04/2008 have been entered and fully considered.

Claims 1-12 are currently pending.

***Claim Objections***

The claim objection has been withdrawn in light of the applicant's amendment.

***Claim Rejections - 35 USC § 112***

The 112 2nd rejections have been withdrawn in light of the applicant's amendment.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1 applicant has amended the following limitation to claim 1, "heating the drained acidic slurry to a temperature exceeding 20 degrees C. This claim limitation given its broadest reasonable would mean that the drained acidic slurry could be heated to any temperature including 90 degrees C, 100 degrees C, or higher.

Applicant's specification specifically states that the acidic slurry temperature *should not exceed* 80 degrees (emphasis added). Applicant also discloses the subject matter containing the endpoints of 40 degrees C and 60 degrees C.

Therefore the recitation in claim 1 allowing temperatures greater than 80 degrees C, such as currently written, was not in the applicant's possession at the time of the invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., and U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al.

As for claim 1, CAEL discloses a process for delignifying cellulose using monopersulfuric acid or salt thereof pretreatment followed by a kraft pulping [column 2 lines 12-16 and 23-25]. CAEL discloses adding monopersulfate to the chips, at a liquor ratio of 7.6 to 1 which is a fluid fraction greater than 50% (*exposing the chips to an acidic treatment device by*

*adding an acidic treatment fluid to establish an, acidic slurry having a fluid fraction exceeding 50%;*[see e.g. column 4 lines 14-15 and lines 39-40]). CAEL further discloses that the chips are drained of monopersulfate solution where the examiner has interpreted drained to have removed substantially all the free monopersulfate acid *(draining the chips from the acidic slurry so that the drained chips obtain a remaining free acidic fluid fraction surrounding the chips that does not exceed 10% by volume excluding any chip moisture disposed inside the chip* [see e.g. column 2 line 23]). CAEL discloses the treatment temperature range of 20 degrees to 80 degrees C (*heating the drained acidic slurry to a temperature exceeding 20° C* [column 3 lines 5-10]).

CAEL et al. does not disclose that the acidic monopersulfate solution is recycled or that only the amount of retained acid is added to the chips. MARZOLINI et al. discloses a process for delignifying cellulose using a monopersulfate solution with recycle of the fluid to the first step of acid treatment and adding the correct amount of monopersulfate restored by a new addition (*recycling the drained acidic slurry to the acidic treatment device; adding additional acidic treatment fluid to the acidic treatment device only in a replacement amount that corresponds, to an amount of acidic fluid that is retained in the drained chips;*[see e.g. abstract, column 2 lines 48-50, column 3 lines 29-30]). Examiner notes that that the lignocellulose can have the acid extracted to the high consistency of 30% which the examiner has interpreted as a low amount of free liquor [see e.g. claim 1].

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the monopersulfate treatment of CAEL using the recycling technique of MARZOLINI et al. A person of ordinary skill in the art would have been motivated to recycle to

conserve chemicals and improve the pulp properties as suggested by MARZOLINI et al. [see e.g. column 2 lines 55-60].

CAEL discloses that following the monopersulfate treatment is a traditional kraft cook. The traditional kraft cook disclosed by CAEL does not suggest the 2 different temperature treatments as required in the instant claims. SNEKKENES et al. discloses an improved kraft cooking process over a traditional ITC kraft process which is superior to traditional ITC kraft cooking [improved process following steps 1-3 giving multiple benefits; see e.g. column 1 lines 45-65]. The process has a steaming vessel heating the chips to one temperature with steam, (*heating the drained chips by steam to a first temperature* [see e.g. steaming vessel 20B]) and then is followed by a second step where heating is done with a high sulfidity alkaline extraction liquor with a temperature of 100-160 deg C *(heating the drained chips to a second temperature not exceeding 140 °C while adding an alkali impregnation liquid the second temperature being higher than the first temperature*.[see e.g. column 5 lines 4-17]) This range of temperatures overlaps the instant claimed temperature range of below 140 deg C. The reference further teaches that the impregnation temperature is preferably below 140 deg C [column 5 line 35-36]. Further, the second temperature is stated to be higher than the steaming vessel temperature as SNEKKENES states the chips are further heated in the impregnation vessel implying a higher temperature after the steaming vessel [column 5 lines 11-13].

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the monopersulfate treatment of CAEL, with the recycling of reagents of MARZOLINI et al. with the improved kraft cooking process of SNEKKENES et al. A person of ordinary skill in the art would be motivated to use the kraft process of SNEKKENES et al.

instead of the traditional kraft process of CAEL because the improved kraft process of SNEKKENES et al. leads to reduced H-factor, reduced consumption of chemicals, better heat economy, and better pulp properties [see e.g. column 1 lines 58-65].

As for claim 2, SNEKKENES et al. discloses as part of the kraft process the chips are heated by a warm alkali impregnation liquid [see e.g. column 5 lines 4-17]).

As for claim 3, SNEKKENES et al. discloses part of the kraft process the chips are heated by a warm alkali impregnation liquid [see e.g. column 5 lines 4-17]). SNEKKENES further discloses that a traditional screen can be provided if desired [column 3 lines35-36]. With a traditional screen in center of the impregnation vessel, chips would flow downward in the vessel. Alkaline impregnation fluid would flow down concurrently with the chips above the screen while alkaline impregnation fluid would flow counter currently to chips below the screen.

As for claim 4, SNEKKENES et al. discloses that the chips are sent to the steaming vessel (20B) where they are heated by steam and then sent to the impregnation vessel where they contact the alkali in the impregnation vessel and form a liquid and chip slurry (1) [Figure 1 and column 5 lines 4-17].

As for claim 5, MARZOLINI et al. discloses that a monopersulfate treatment of lignocellulose has a pH of approximately 1.2 which is one specific point which falls within the instant claimed range [column 3 line 23].

As for claim 6, MARZOLINI et al. discloses that the monopersulfate is recycled back to the first treatment stage therefore there is no loss of acidic treatment fluid in excess of what accompanies the chips and adding the correct amount of monopersulfate restored by a new addition [see e.g. abstract, column 2 lines 48-50, column 3 lines 29-30].

As for claim 7, 8, and 9 SNEKKENES et al. discloses as part of the kraft process the chips are heated by a warm alkali impregnation liquid which is extracted black liquor[column 5 lines 4-17]). Extracted black liquor has a sulfidity of .15-25 mol/liter and low in NaOH as evidenced applicant's specification [pg.7 lines 24-33, pg. 8 lines 1-10]. Examiner has interpreted a sulfidity of 0.15-0.25 mol/liter to be a sulfide rich liquor. SNEKKENES describes the black liquor as having a NaOH content of 13-30 g/L, 0.4 – 1.0 mol/liter, which overlaps with the claimed range of less than 0.75 moles/liter.

As for claim 10, CAEL discloses a treatment time of about 30 minutes to 3 hours [column 3 lines 5-10] but does not teach away from the lower time range because 20 minutes is about 30 minutes. At the time of invention it would have been obvious to a person of ordinary skill in the art to optimize the acidic pretreatment temperature to effect the delignification and yield of the cellulose [see e.g. MPEP 2144.05 II B]. Furthermore, MARZOLINI teaches that the acid treatment can range from about 5 minutes to 90 minutes which overlaps with the instant claimed range of 1-20 minutes [column 2 lines 61-67].

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., and U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al., as applied to claim 1-10 above, and in further view of U.S. Patent 5,338,366 GRACE et al., hereinafter GRACE et al.

CAEL teaches that monopersulfate can be added for treatment of chips, which necessarily occurs in a vessel, at temperatures of 40 to 80 deg C [column 3 lines 10-11]. CAEL

fails to teach how the monopersulfate solution is heated to this range. GRACE et al. teaches us that acid solutions can be heated by a heat exchanger [column 3 lines 61-62 column 4 lines 20-27]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to heat the acid solution of CAEL with the heat exchanger of GRACE et al. The use of a heat exchanger is well within the capability of a person of ordinary skill in the art. A person of ordinary skill in the art would be motivated to use a heat exchanger to heat the acid solution to the desired temperature of CAEL if the purchased acid solution was cold. An indirect heater would be preferable to a direct steam heater as to prevent the wasting of steam condensate or the ability to use low grade waste heat streams to heat the acid solution at low cost.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., in further view of U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al. as applied to claim 1-10 above, and as further evidenced by METSO valve document.

As for claim 12, SNEKKENES et al. discloses that the chips enter into a steaming vessel in the cooking process (20B) [Figure 1]. SNEKKENES does not teach the temperature of the steaming vessel. However, a typical steaming vessel heats chips to about 120 deg C as evidenced by METSO valve document [pg 2 column 2] which renders the instant claimed range obvious.

***Response to Arguments***

Applicant's arguments filed 3/04/2008 have been fully considered but they are not persuasive. The applicant maintains the position that a person of ordinary skill in the art would have no reason to look at a recycling scheme in CAEL. CAEL chief advantage is pre-treating the chips is removing non-cellulosic materials (lignin) by impregnating the chips [abstract]. Saving and recovering chemicals such as unused monopersulfate would be financially valuable to a person of ordinary skill in the art. Applicant argues that the components such as lignin would not be removed if recycling was done therefore defeating the purpose of CAEL is acknowledged, However, it is the examiners position that the components would still be removed during a later extraction during kraft pulping if recycling of monopersulfate was performed. The selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results [see e.g. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)]. In the instant case the removal of the lignin in the impregnation step or the removal of the said lignin in the subsequent cooking step would be *prima facie* obvious.

Applicant argues that MARZOLINI can not cure the deficiencies of CAEL because a person of ordinary skill in the art would not look to MARZOLINI to obtain the teaching of recycling. Applicant further argues the specific point that the temperature teaching of MARZOLINI teaches away from the temperature teaching of CAEL and therefore a person of ordinary skill in the art would not look to MARZOLINI to cure any deficiencies in CAEL.

Examiner first notes that both CAEL and MARZOLINI are related to the treatment of lignocellulosic materials. Further, both MARZOLINI and CAEL both related to the specific art of treating lignocellulosic materials with monopersulfate solutions. CAEL teaches the

temperature range of *20 degrees C to 80 degrees C* [column 3 lines 5-10]. MARZOLINI teaches the temperature range of *preferably lower than 20 degrees C* [column 2 lines 65-67]. The endpoint of treatment ranges of CAEL and MARZOLINI at least abutting. The 'preferably' language of MARZOLINI suggests that temperatures somewhat higher than 20 degrees C are allowed. Therefore the temperature ranges are not conflicting. Finally, an artisan of ordinary skill would be capable of adjusting the monopersulfate solution to a temperature that maximizes treatment while maintains stability.

Therefore a showing of unexpected results for recycling the acid of CAEL in the method MARZOLINI is required to overcome the rejection.

Applicant argued the remaining dependent claims on the basis that they were dependent on claim 1 which applicant argued was allowable and also did not address the SNEKKENES inclusion in the rejection of claim 1. A showing of unexpected results for the limitations that required the reference SNEKKENES to make the 103(a) could also be used to overcome the rejection.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571) 270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJC

/Eric Hug/

Primary Examiner, Art Unit 1791